Cerebral Torque in Nonhuman Primates

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Introduction

Cerebral torque is asymmetry of the frontal and parieto-occipital regions of the brain. Torque and related structural asymmetries have been linked to the development of schizophrenic and affective type psychoses. Recent evidence suggests that cerebral torque is also present in nonhuman primates, leading to the question- 'Do nonhuman primates also suffer from psychosis?'

The aim of this project is to investigate the instance of cerebral torque in apes and monkeys. We have previously tested the hypothesis that these species display apparent psychotic behaviours both in captivity, and in the wild. We are therefore assessing whether or not non human primates also have the same associated anatomical variation in the brain.

Methods

Cranial morphometrics will use CT scans of target species crania. The midline between crista frontalis and confluence of sinuses will be found. MorphoJ software will be used to measure scans for torque.

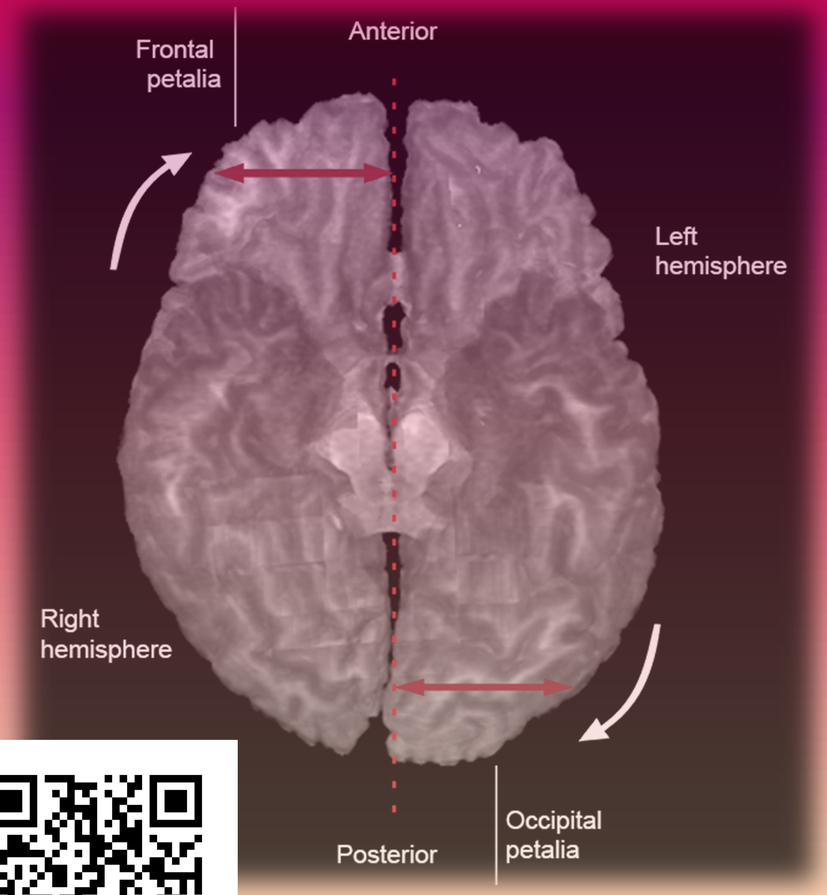
Predicted Results

We predict that nonhuman primates will show evidence of torque at the population level.

Discussion

If cerebral torque exists in ape brains, this shows that associated psychosis is possible. This would imply an ape origin for psychosis that predates *Homo sapiens.*

Cerebral torque present in **nonhuman primates**. **Abnormal** formation suggests **psychosis** susceptibility.



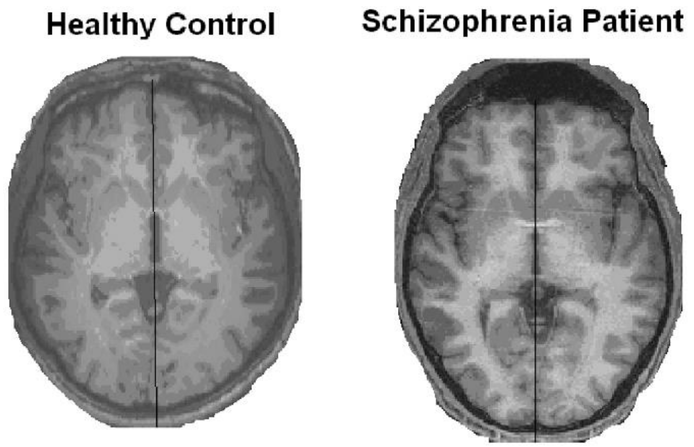


Figure 1 *Cerebral torque in healthy vs schizophrenia patient.* Image from Oertel-Knochel and Linden (2011).

Table 1 *Cerebral asymmetries in great apes.* Adapted from Pilcher, Hammock and Hopkins (2001).

Author(s)	Species/Method	Results
Groves & Humphrey (1973)	21 mountain gorillas/skull length	Left half of skull longer
Gannon et al. (1998)	18 chimpanzee cadavers/planum temporale area	Larger left planum temporale
Hopkins et al. (1998)	21 apes MRI/planum temporale volume	Larger left planum temporal
Hopkins and Marino (2000)	19 chimpanzees MRI/frontal and occipital width	Leftward occipital; rightward frontal
Holloway & De La Coste-Lareymondie (1982)	135 ape endocasts/qualitative score of petalias	65 leftward, 26 rightward occipital; 53 rightward, 12 leftward frontal petalia
LeMay (1976)	28 great ape cadaver photos/occipital petalia and width	Rightward occipital petalia; leftward width
Zilles et al. (1996)	9 chimpanzee cadavers/differences in chimerics of hemispheric petalias	No differences in petalias
Yeni-Komishan & Benson (1976)	25 chimpanzee cadavers/sylvian fissure length	Left sylvian fissure longer